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A33718 PCT USA - 072819.0125

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Scullion et al.  
Serial No. : 09/700,512  
Filed : November 13, 2000  
For : A BEVERAGE

CLAIM FOR PRIORITY UNDER 35 U.S.C. § 119

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Date of Deposit

Ronald B. Hildreth

Attorney Name

19,498

PTO Registration No.

January 30, 2001

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Signature

Assistant Commissioner for Patents

Washington, D.C. 20231

Sir:

A claim for priority is hereby made under the provisions of 35 U.S.C. § 119 for  
the above-identified PCT application based upon Great Britain application Nos. GB  
9810309.6 filed May 15, 1998, 9828321.1 filed December 23, 1998, 9828317.9 filed

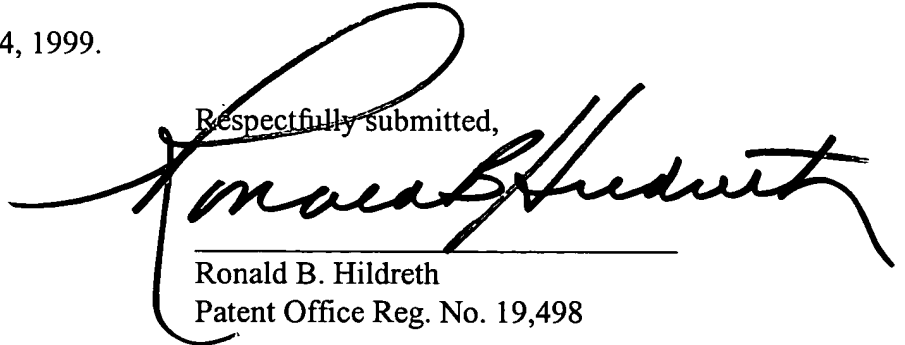
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PATENT

December 23, 1998, and 9901018.3 filed January 19, 1999, and International Application  
PCT/GB99/01551 filed May 14, 1999.

Respectfully submitted,



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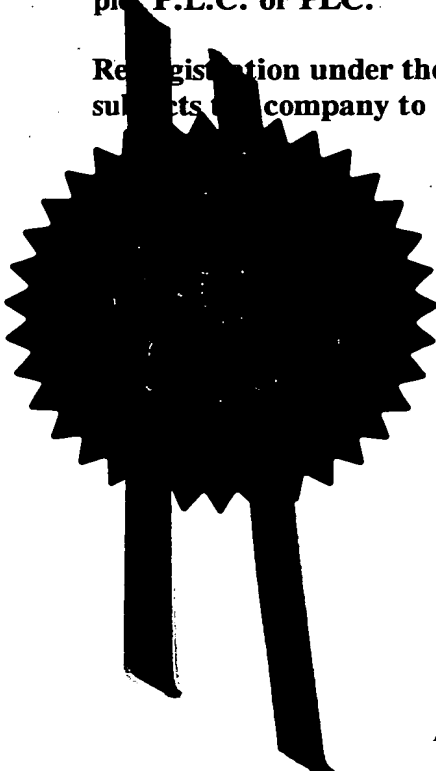
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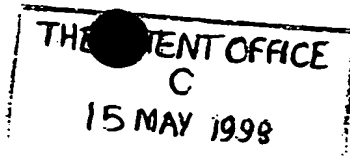


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Dated

19 May 1999



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(See the notes on the back of this form. You can also get an explanatory leaflet, from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road  
Newport  
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1. Your reference **J1528**

2. Patent app **9810309.6**  
(The Patent Office will fill in this part)

**15 MAY 1998**

3. Full name, address and postcode of the or of each applicant (underline all surnames)  
**Bass Public Limited Company**  
**No. 1 First Avenue**  
**Centrum 100**  
**Burton-on-Trent**  
**Staffordshire**

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation **England**

64 395 90001

4. Title of the invention **A BEVERAGE**

5. Name of your agent (if you have one) **Barker Brettell**  
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)  
**138 Hagley Road**  
**Edgbaston**  
**Birmingham**  
**B16 9PW**

Patents ADP number (if you know it)

**232001**

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number	Country	Priority application number (if you know it)	Date of Filing (day/month/year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application	Date of filing (day/month/year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request (Answer 'Yes' if:  
a) any applicant named in part 3 is not an inventor, or  
b) there is an inventor who is not named as an applicant, or  
c) any named applicant is a corporate body.  
See note (d)) **Yes**

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Description 12 + 12

Claim(s) 9 + 9

Abstract -

Drawing(s) 2 + 2



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Priority documents -

Translations of priority documents -

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*) -

Request for preliminary examination 1  
(*Patents Form 9/77*)

Request for substantive examination -  
(*Patents Form 10/77*)

Any other documents -  
(*please specify*)

11. I/We request the grant of a patent on the basis of this application.

Signature

Barker Brettell

Date

14.05.1998

Name and daytime telephone number of person to contact in the United Kingdom

John Lawrence

Tel: 0121 456 1364

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# A BEVERAGE

5 This invention relates to a beverage, to a method of serving said beverage, to providing a visual display in a beverage, and to apparatus to supply draught beverage.

10 According to a first aspect of the invention, there is provided a beverage comprising a water content and a dissolved gas content, wherein prior to being drunk said beverage is cooled to a temperature below the freezing point of water at ambient atmospheric pressure and delivered in a container to be drunk exposed to ambient atmospheric pressure, and wherein in said container aforesaid gas bubbles out of the beverage and at least a portion of said water content becomes ice.

15 According to a second aspect of the invention, there is provided a beverage to be available on draught and comprising a water content and a dissolved gas content, wherein prior to being drunk the draught beverage is to issue, at a temperature below the freezing point of water at ambient atmospheric pressure, from an outlet into a container open to ambient  
20 atmospheric pressure so that aforesaid gas bubbles out of the beverage and at least a portion of said water content becomes ice.

The beverage is delivered into a container or drinking vessel. The container or drinking vessel can have at least a wall portion of sufficient  
25 transparency to allow the contents of the container or drinking vessel to be visible through said wall portion. Said container or vessel may be of glass. If desired, the container or drinking vessel can have a shape or formation to promote formation of the ice. For example, the container or drinking vessel may have an internal surface to provide nucleation sites to  
30 promote formation of the ice. Said surface may have at least a surface

portion which is roughened. At least a wall portion of the container or drinking vessel can be arranged to change colour automatically with variation in temperature. Said wall portion may comprise thermo-chromic material.

5

The beverage may be non-alcoholic or alcoholic. If the latter, the beverage may be a lager, a beer, a stout, or a cider.

Desirably, the gas is a non-oxidising gas. This can avoid or at least slow  
10 deterioration of the beverage. The gas comprises carbon dioxide and/or  
nitrogen. By cooling the beverage and forming ice therein, this appears  
to, initially at least, reduce the rate of release of dissolved gas from the  
beverage, for example lager, and appears to improve the drinking  
sensation, taste, flavour or bight. We believe that this is a combination of  
15 the low drinking temperature (maintained by the ice) and the greater  
amount of retained gas in the beverage.

The presence of the ice can provide an interesting and attractive feature  
which can be particularly fascinating as the ice may expand at a noticeable  
20 rate throughout the beverage after the container is filled. To add to the  
interest, the ice may include therein one or more streaks or regions of one  
or more colours which contrast(s) with the colour of the ice and/or  
beverage.

25 The aforesaid ice may be, or may have, the character of slush.

According to a third aspect of the invention, there is provided a method of  
serving a draught beverage which comprises a water content and a  
dissolved gas content, said method comprising issuing the draught  
30 beverage from an outlet into a container, prior to said issuing storing or



handling the beverage in a manner which impedes loss of the aforesaid dissolved gas from the beverage and cooling said beverage to a temperature below the freezing point of water at said ambient atmospheric pressure, and in said container aforesaid gas bubbles out of the beverage and at least a portion of said water becomes ice.

According to a fourth aspect of the invention, there is provided a method of providing a visual display or effect within a container having at least a portion of wall of some transparency, said method comprising providing a draught beverage comprising a water content and a dissolved gas content, issuing the draught beverage from an outlet into a container, prior to said issuing, storing or handling the beverage in a manner which impedes loss of aforesaid dissolved gas from the beverage and cooling said beverage to a temperature below the freezing point of water at said ambient atmospheric pressure, and a visual display or effect developing in the beverage in the container, said visual display or effect comprising aforesaid gas bubbling out of the beverage and formation of ice due to at least a portion of said water becoming ice.

In the method of serving, the container may also have a wall portion of some transparency. Desirably, the wall portion is of sufficient transparency to allow the contents of the container to be visible through said wall portion. The container may comprise glass.

Formation of ice can develop in the container so as to increase the amount and extent of the ice from substantially an upper level of the beverage downwards through the beverage.

At least a wall portion of the container may change colour automatically with variation in temperature. Said wall portion may comprise thermo-chromic material.

- 5 The container can have a shape or formation to encourage the forming of the ice. If desired, the container can have one or more internal formations to encourage the forming of the ice. At least a portion of an internal wall of the container may have a roughened texture. The container may be adapted to encourage formation of further ice in the  
10 beverage below an upper layer of forming ice, said further ice rising to join the upper layer.

- An implement can be inserted into the beverage in the container to encourage formation of said ice. For example, the implement may be a  
15 thermometer, or it may be a swizzle-stick.

- Colouring material or dye can be provided to form at least one coloured streak or region in the beverage and/or ice, the colour of said material or dye being in contrast to that of the ice and/or beverage so as to be visible.  
20

The aforesaid implement may be used to add the colouring material or dye to the beverage and/or ice.

- Preferably, the gas is a non-oxidising gas. The gas may comprise carbon  
25 dioxide and/or nitrogen.

The beverage may be alcoholic - in which case the beverage may be a lager, a beer, a stout, or a cider - or it may be non-alcoholic.

Desirably, the beverage issues at substantially  $-4^{\circ}\text{C}$  into the container, and thereafter may rise almost immediately to at least substantially  $-3^{\circ}\text{C}$ .

5 According to a fifth aspect of the invention, there is provided apparatus to supply draught beverage, comprising beverage heat exchange means, a beverage outlet for cold beverage from said heat exchange means to issue from the outlet, openable and closable valve means to control supply of beverage to said outlet, and a beverage circulation loop for beverage to circulate in said loop.

10

The beverage can circulate in the loop when the valve means is closed. Preferably, the loop comprises pump means to circulate said beverage.

15 A purpose of circulating the beverage is to reduce the risk of or avoid freezing beverage blocking a beverage supply path to the outlet. Said loop may include a beverage flow passage in said heat exchange means.

20 In a preferred embodiment, the apparatus can comprise a unit or dispenser mountable on a counter of a drinks' bar and comprising the heat exchange means and the outlet.

25 A beverage flow path can connect a reservoir of the draught beverage to the heat exchange means. That flow path may comprise at least a portion of the loop.

The flow pay may divide into a plurality of beverage routes, and the loop may comprise one or more of the routes.

Intermediate the reservoir and the first-mentioned heat exchange means, the beverage may be subject to the effect of second beverage cooling heat exchange means.

- 5 The reservoir may be subjected to cooling.

If desired, the second heat exchange means may act on at least a portion of the loop.

- 10 Coolant common to the first and second heat exchange means may circulate therethrough.

Beverage cooling heat exchange means may act on the beverage intermediate said reservoir and loop.

15

The apparatus can be arranged to operate so that the beverage emerges from the outlet at a temperature below the freezing point of water at the ambient atmospheric pressure. Preferably, the beverage emerges at a temperature of substantially  $-4^{\circ}\text{C}$ .

20

The apparatus may be used to supply draught alcoholic beverage having a water content and a dissolved gas content, for example a lager, a beer, a stout, or a cider.

- 25 The gas content, in a lager for example, may be substantially 2.2% by volume of carbon dioxide and/or substantially 40 parts per million (p.p.m.) of nitrogen.

- The invention will now be further described, by way of example, with  
30 reference the accompanying drawings, in which:-

Figure 1 is a diagrammatic view of apparatus according to the fifth aspect of the invention which can dispense a beverage according to the first or second aspect in the performance of a method according to the third or fourth aspect;

Figures 2 to 4 show diagrammatically in side elevation a beverage according to the first or second aspect of the invention in a container or drinking vessel during performance of the method according to the third or fourth aspect of the invention, different stages in the method being represented in Figures 2 to 4 respectively; and

Figures 5 to 7 respectively show diagrammatic side elevations illustrating modifications of the method according to the third or fourth aspect of the invention.

With reference to Figure 1, apparatus to supply a beverage on draught is indicated at 2.

The draught beverage is stored in a keg or cask 4 which may be made of metal. The cask 4 can be stored in a cold-room known per se in public houses or clubs and/or, if desired, in a more specific cold or cooled enclosure 6, for example a tank containing a chilled mixture of water and ethylene glycol. The beverage has a water content and a dissolved gas content. This gas may be any suitable non-oxidising gas, for example carbon dioxide and/or nitrogen. The amount of gas dissolved in the beverage may be within the usual known range for beverages and the pressure within the cask 4 and the remainder of the supply apparatus

(described below) may also be within the usual known range for gassified drinks supplied on draught.

The beverage may be alcoholic or non-alcoholic. The beverage may be a  
5 lager, a beer, a stout, or a cider. The dissolved carbon dioxide content  
may be substantially 2.2% by volume and/or the dissolved nitrogen  
content may be substantially 40 p.p.m.

A pump 8, arranged to operate substantially only when the  
10 manually-operable valve 10 is open, is provided to pump beverage from  
the cask 4 along a pipe 12 ultimately to the valve 10 and a dispense  
outlet 14 therefrom. In known manner, a blanket or atmosphere of  
non-oxidising gas (for example carbon dioxide and/or nitrogen) from a  
suitable supply 16 is provided in the cask 4 and assists the pump 8 in the  
15 extraction of the beverage.

A beverage dispense unit is indicated generally at 18 and has a cover  
indicated by interrupted lines 20. The dispense unit may be mounted at or  
in the vicinity of a drinks' bar - for example on the top of, or  
20 incorporated into, a counter of the bar.

In proximity to the cover 20 the pipe 12 divides into two flow paths 22  
and 24, each leading to the valve 10. One is formed by  
piping 22a,22b,22c and passages 26 in heat exchangers 28a and 28b, and  
25 the other is formed by piping 24a,24b,24c and passages 26 in heat  
exchangers 28c and 28d.

A chiller unit 30 circulates coolant through passages 32 in the heat  
exchangers 28 in series by a system comprising a coolant flow pipe 34  
30 and a coolant return pipe 36.

Beverage pipes 22a and 24a can be bundled together in known manner with the coolant pipes 34 and 36 to form a python 38.

5 The heat exchangers 28 may be plate heat exchangers.

A circulation pump 40, which may operate continuously, extends between the flow paths 22 and 24 adjacent to the junction between the pipe 12 and the flow paths. Thus, the flow paths 22,24 and the pump 40 form a  
10 circulation loop 22,24,40 around which beverage is continuously circulated when valve 10 is closed.

As suggested by Figure 1, in the beverage dispense unit 18, the heat exchangers 28 are within the cover 20, whilst the valve 10 and outlet 14  
15 can be on its exterior, and a portion of the circulation loop comprised by the pump 40 and sections of pipes 22a and 24a is also external of the cover and may be exposed to ambient temperature at the bar.

If desired, the pipe 12 may be incorporated in known manner into another  
20 cooling python 42 comprising flow and return pipes 44 and 46, carrying coolant from and back to a chiller unit 48.

Overall, the beverage cooling arrangement - and particularly that provided by the dispense unit 18 by the heat exchangers 28 - so cools the beverage  
25 that the beverage issuing from the outlet 14 when valve 10 is opened at a temperature below the freezing point of water at the ambient atmospheric pressure. For example, the beverage may issue at a temperature of substantially  $-4^{\circ}\text{C}$  into a drinking vessel or drinking glass.

When the valve 10 is closed, the beverage is circulated automatically around the loop 22,24,40 so it cannot stand still and start to freeze and block the supply path to valve 10.

- 5 In the case of draught beverages conventionally served with a head (for example lager, beer or stout) the outlet 14 may include a known orifice plate to promote foaming.

10 With reference to Figure 2, when a draught beverage 50 is delivered from the outlet 14 (Figure 1) into a drinking vessel 52 (for example a glass) the beverage is exposed to ambient atmospheric pressure and ambient or room temperature, the beverage temperature starts to increase, for example to  $-3^{\circ}\text{C}$ . Almost immediately, a slug of ice 54a forms near the top of the vessel 50 at the upper level of the beverage, the ice being caused (we  
15 believe) as a result of nucleation sites resulting from the forming of bubbles of the dissolved gas. If the beverage 50 has a head 56 of foam, the ice forms just below the head. The ice is in the nature of slush and is formed from the water already forming the beverage. The slug of ice grows as indicated at 54b in Figure 3 and 54c in Figure 4 until it may  
20 substantially occupy the vessel 52. The growth of ice (in, say, a pint glass) can be accomplished in a minute or two, is fascinating to watch and can give rise to interesting visual effects based on the growth of the ice and the bubbling off of the gas. Another interesting visual effect is that cooled beverages delivered into a drinking vessel from the apparatus in  
25 Figure 1 swirl in the vessel for a longer time period than beverages which have not been cooled.

Not only does the formation of the ice give rise to interesting visual effects, but the existence of the ice helps to keep the drink cool longer.  
30 Also, since the ice is formed from the water in the beverage, the beverage



is not diluted by the ice. In fact, for an alcoholic beverage, the overall amount of alcohol remains the same in the container when the ice forms, but since water is being used for the ice, the alcoholic strength of the remaining liquid beverage increases until the ice melts.

5

The vessel 52 may be shaped or formed to encourage formation of the ice. In Figure 5, a region 58 (having a rough surface) is provided to encourage formation of nucleation sites to promote formation of a further ice slug 54d which rises as indicated by arrow A to enlarge the ice slug 54 developing from the top of the vessel 52.

10

In Figure 6, formation of further ice 54e in the body of the beverage 50 is encouraged by the insertion therein of an elongate implement or rod 60 represented in Figure 6 by a swizzle-stick having formations 62 and 64 at its lower end and shank respectively which further encourage development of nucleation sites. In another instance, the rod 60 may be a thermometer body which can also be used to take the temperature of the drink to see if it has risen sufficiently high for it to be safe to drink. The implement can be used to push the ice around.

15

20

In Figure 7, coloured regions or streaks are shown in the ice 54 and beverage 50. These coloured formations are formed by the release of non-toxic, edible, colouring materials or dyes into the beverage 56. The colouring material or dye, which stands out visually from the ice and beverage, may be injected into the beverage, or may be introduced into the beverage by or on the aforesaid implement.

25

It is preferable for the vessel 52 to have a wall of sufficient transparency so that the formation of the ice slug 54 in the beverage 50 can be observed and its changing nature visually appreciated.

30

The drinking vessel 52 can be formed of, or have external surface areas formed of, material (for example thermo-chromic material) which automatically changes colour with temperature change. Apart from this  
5 being a further interesting visual effect, the attainment of one particular colour may signal that the beverage is at a suitable temperature for drinking.

Whilst any kind of beverage having a water and dissolved gas content may  
10 be used, we believe that lager demonstrates the nature of the invention well.

## CLAIMS

1. A beverage comprising a water content and a dissolved gas content, wherein prior to being drunk said beverage is cooled to a temperature  
5 below the freezing point of water at ambient atmospheric pressure and delivered in a container to be drunk exposed to ambient atmospheric pressure, and wherein in said container aforesaid gas bubbles out of the beverage and at least a portion of said water content becomes ice.
- 10 2. A beverage to be available on draught and comprising a water content and a dissolved gas content, wherein prior to being drunk the draught beverage is to issue, at a temperature below the freezing point of water at ambient atmospheric pressure, from an outlet into a container open to ambient atmospheric pressure so that the aforesaid gas bubbles out  
15 of the beverage and at least a portion of said water content becomes ice.
3. A beverage as claimed in claim 1 or claim 2, in a container or drinking vessel.
- 20 4. A beverage as claimed in claim 3, in which said container or drinking vessel has at least a wall portion of sufficient transparency to allow the contents of the container or drinking vessel to be visible through said wall portion.
- 25 5. A beverage as claimed in claim 3 or claim 4, in which the container or drinking vessel is made of glass.
6. A beverage as claimed in any one of claims 3 to 5, in which the container or drinking vessel has a shape or formation to promote  
30 formation of said ice.

7. A beverage as claimed in any one of claims 3 to 6, in which the container or drinking vessel has an internal surface arranged to provide nucleation sites to promote formation of said ice.

5

8. A beverage as claimed in claim 7, in which said surface has at least a surface portion which is roughened.

9. A beverage as claimed in any one of claims 3 to 8, in which the container or drinking vessel has at least a wall portion arranged to change colour automatically with variations in temperature.

10

10. A beverage as claimed in claim 9, in which said wall portion comprises thermo-chromic material.

15

11. A beverage as claimed in any preceding claim, in which the beverage is an alcoholic beverage.

12. A beverage as claimed in claim 11, in which the beverage is a lager, a beer, a stout, or a cider.

20

13. A beverage as claimed in any one of claims 1 to 10, in which the beverage is non-alcoholic.

14. A beverage as claimed in any one preceding claim, in which the gas is non-oxidising gas.

25

15. A beverage as claimed in claim 14, in which the gas comprises carbon dioxide and/or nitrogen.

30

16. A beverage as claimed in any one preceding claim in which the formed ice includes therein one or more streaks or regions of one or more colours which contrast(s) with the colour of the ice and/or beverage.

5 17. A method of serving a draught beverage which comprises a water content and a dissolved gas content, said method comprising issuing the draught beverage from an outlet into a container, prior to said issuing, storing or handling the beverage in a manner which impedes loss of aforesaid dissolved gas from the beverage and cooling said beverage to a  
10 temperature below the freezing point of water at said ambient atmospheric pressure, and in said container aforesaid gas bubbles out of the beverage and at least a portion of said water becomes ice.

18. A method of providing a visual display or effect within a container  
15 having at least a portion of wall of some transparency, said method comprising providing a draught beverage comprising a water content and a dissolved gas content, issuing the draught beverage from an outlet into a container, prior to said issuing, storing or handling of the beverage which impedes loss of aforesaid dissolved gas from the beverage and cooling  
20 said beverage to a temperature below the freezing point of water at said ambient atmospheric pressure, a visual display or effect developing in the beverage in the container, said visual display or effect comprising aforesaid gas bubbling out of the beverage and formation of ice due to at least a portion of said water becoming ice.

25

19. A method as claimed in claim 17, in which the container has a wall portion of some transparency.

20. A method as claimed in any one of claims 17 to 19, in which the  
30 container comprises glass.

21. A method as claimed in any one of claims 17 to 20, in which formation of ice develops in the container so as to increase the amount and extent of the ice from substantially an upper level of the beverage  
5 downwards through the beverage.

22. A method as claimed in any one of claims 17 to 21, in which the container has at least a wall portion which changes colour automatically with variation in temperature.  
10

23. A method as claimed in claim 22, in which said wall portion comprises thermo-chromic material.

24. A method as claimed in any one of claims 17 to 22, in which the  
15 container has a shape or formation to encourage the forming of the ice.

25. A method as claimed in any one of claims 17 to 24, in which the container has one or more internal formations to encourage the forming of the ice.  
20

26. A method as claimed in claim 25, in which at least a portion of an internal wall of the container has a roughened texture.

27. A method as claimed in any one of claims 17 to 26, in which the  
25 container is adapted to encourage formation of further ice in the beverage below an upper layer of forming ice, and said further ice rising to join said upper layer.

28. A method as claimed in any one of claims 17 to 27, in which an implement is inserted into the beverage in the container to encourage formation of said ice.

5 29. A method as claimed in claim 28, in which said implement is a thermometer.

30. A method as claimed in claim 29, in which said implement is a swizzle-stick.

10

31. A method as claimed in any one of claims 17 to 30, in which colouring material or dye is provided to form at least one coloured streak or region in the beverage and/or ice, the colour of said material or dye being in contrast to that of the ice and/or beverage so as to be visible.

15

32. A method as claimed in claim 31 when appended to any one of claims 20 to 30, in which said implement is used to add the colouring material or dye to the beverage and/or ice.

20 33. A method as claimed in any one of claims 17 to 32, in which the gas is a non-oxidising gas.

34. A method as claimed in claim 33, in which the gas comprises carbon dioxide and/or nitrogen.

25

35. A method as claimed in any one of claims 17 to 34, in which the beverage is alcoholic.

36. A method as claimed in claim 35, in which the beverage is a lager,  
30 a beer, a stout, or a cider.

37. A method as claimed in any one of claims 17 to 34, in which the beverage is non-alcoholic.

5 38. A method as claimed in any one of claims 17 to 37, in which the beverage issues at substantially  $-4^{\circ}\text{C}$ .

39. A method as claimed in any one of claims 17 to 38, in which the beverage in the container rises to a temperature of at least  
10 substantially  $-3^{\circ}\text{C}$ .

40. A beverage as claimed in any one of claims 1 to 16 or a method as claimed in any one of claims 17 to 39, in which said ice comprises slush.

15 41. Apparatus to supply a draught beverage, comprising beverage cooling heat exchange means, a beverage outlet for cold beverage from said heat exchange means to issue from the outlet, openable and closable valve means to control supply of beverage to said outlet, and a beverage circulation loop for beverage to circulate in said loop.

20 42. Apparatus as claimed in claim 41, in which the beverage circulates in said loop when the valve means is closed.

43. Apparatus as claimed in claim 41 or claim 42, in which said loop  
25 comprises pump means to circulate beverage in the loop.

44. Apparatus as claimed in any one of claims 41 to 43, in which the beverage is circulated to reduce the risk of, or avoid, freezing beverage blocking a beverage supply path to the outlet.



45. Apparatus as claimed in any one of claims 41 to 44, in which said loop includes a beverage flow passage in said heat exchange means.

46. Apparatus as claimed in any one of claims 41 to 45, comprising a unit or dispensers mountable on a counter of a drinks' bar and comprising the heat exchange means and the outlet.

47. Apparatus as claimed in any one of claims 41 to 46, in which a beverage flow path connects a reservoir of said draught beverage to said heat exchange means.

48. Apparatus as claimed in claim 47, in which said flow path comprises at least a portion of said loop.

49. Apparatus as claimed in claim 47, in which said flow path divides into a plurality of beverage routes, and said loop comprises one or more of said routes.

50. Apparatus as claimed in claim 47, in which intermediate said reservoir and said first-mentioned beverage cooling heat exchange means, the beverage is subject to the effect of second beverage cooling heat exchange means.

51. Apparatus as claimed in claim 47, in which the reservoir is subjected to cooling.

52. Apparatus as claimed in any one of claims 41 to 47, in which said heat exchange means is first heat exchange means and second beverage cooling heat exchange means is provided to act on at least a portion of said loop.

53. Apparatus as claimed in claim 52, in which coolant common to the first and second heat exchange means circulates therethrough.

5 54. Apparatus as claimed in claim 47, in which intermediate said reservoir and said loop the beverage is subject to the effect of further beverage cooling heat exchange means.

10 55. Apparatus as claimed in any one of claims 41 to 54, in which the apparatus is arranged to operate so that the beverage which emerges from said outlet is at a temperature below the freezing point of water at the ambient atmospheric pressure.

15 56. Apparatus as claimed in any one of claims 41 to 54, in which the apparatus is arranged to operate so that the beverage which emerges from said outlet is at a temperature of substantially -4C.

20 57. Apparatus as claimed in any one of claims 41 to 56, to dispense an alcoholic beverage.

58. Apparatus as claimed in claim 57, in which the beverage is lager, beer, a stout, or a cider.

25 59. Apparatus to supply draught beverage substantially as hereinbefore described with reference to Figure 1 of the accompanying drawings.

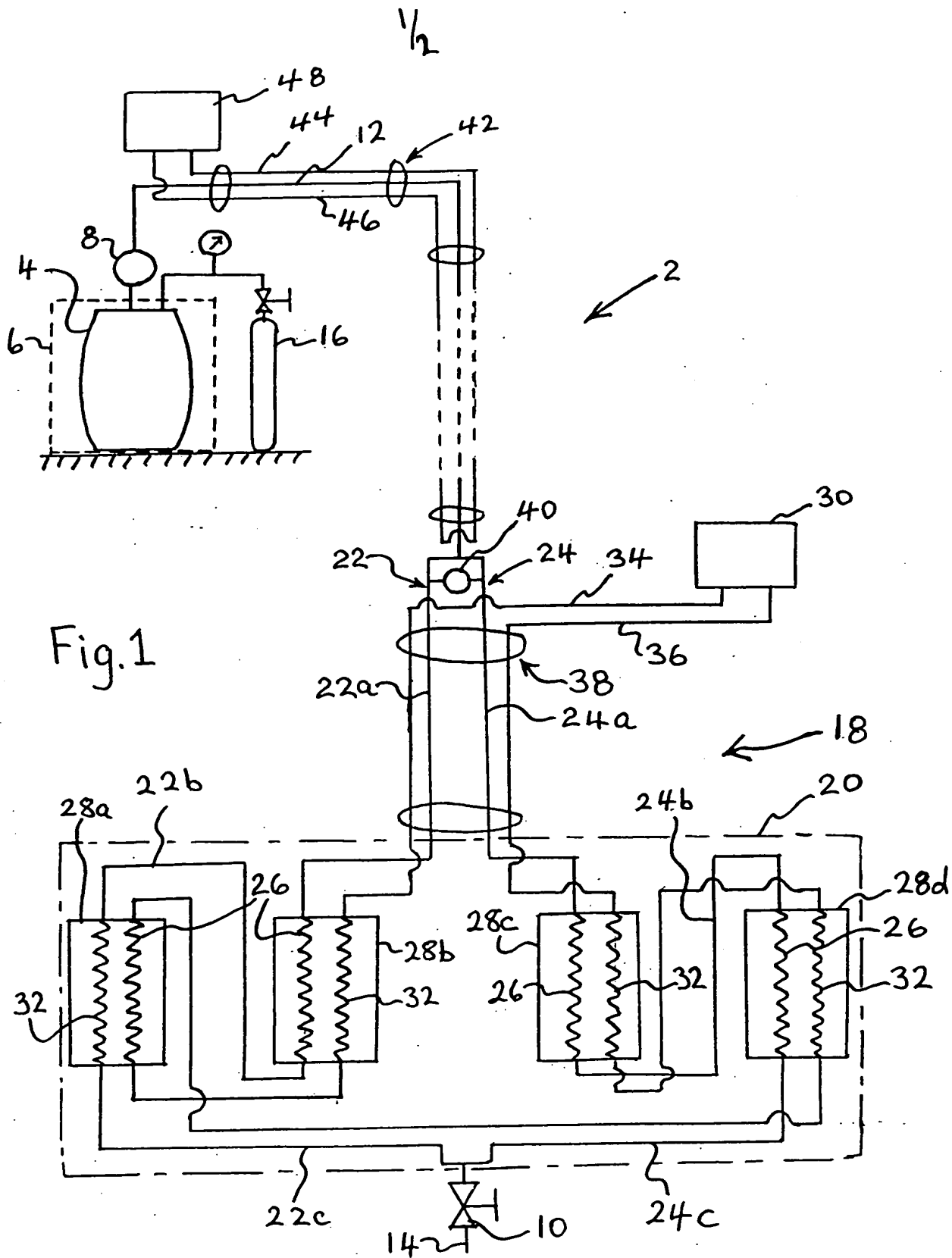
60. Apparatus as claimed in any one of claims 41 to 59 supplying draught beverage as claimed in any one of claims 1 to 16 or claim 40.

61. Apparatus as claimed in any one of claims 41 to 59 used to perform the method claimed in any one of claims 17 to 40.

62. A beverage substantially as hereinbefore described with reference to Figures 2 to 4, or Figure 5, or Figure 6, or Figure 7 of the accompanying drawings.

63. A method of serving a beverage substantially as herein before described with reference to Figure 1, or Figures 2 to 4, or Figure 5, or Figure 6, or Figure 7 of the accompanying drawings.

64. A method of providing a visual display substantially as hereinbefore described with reference to Figure 1, or Figures 2 to 4, or Figure 5, or Figure 6, or Figure 7 of the accompanying drawings.



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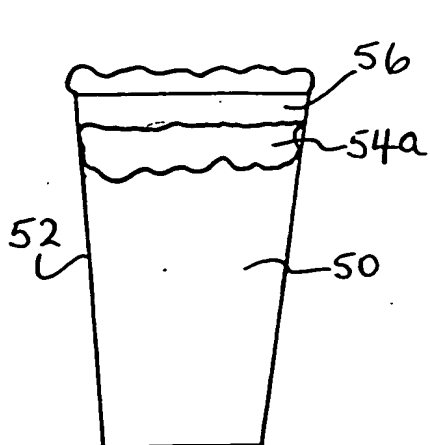


Fig. 2

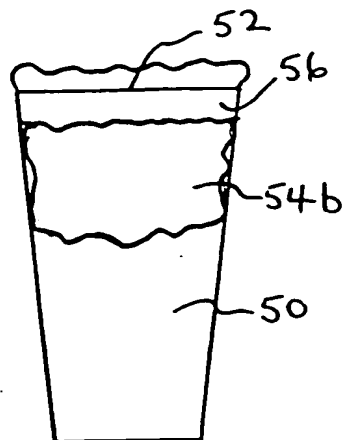


Fig. 3

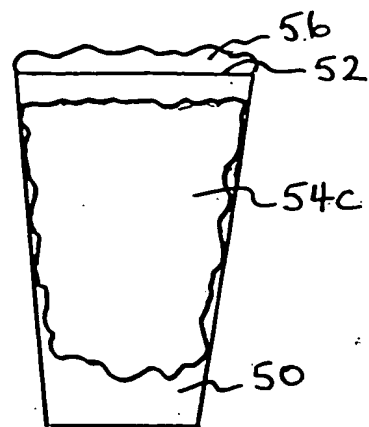


Fig. 4

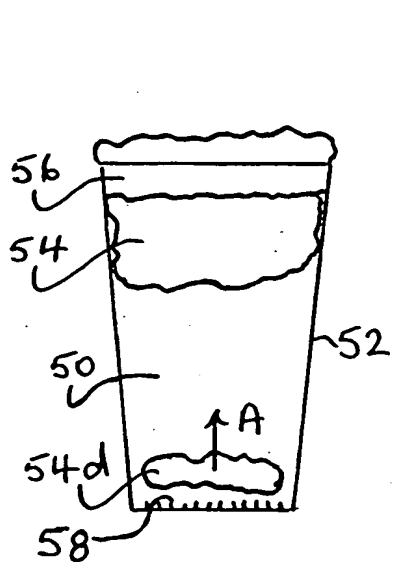


Fig. 5

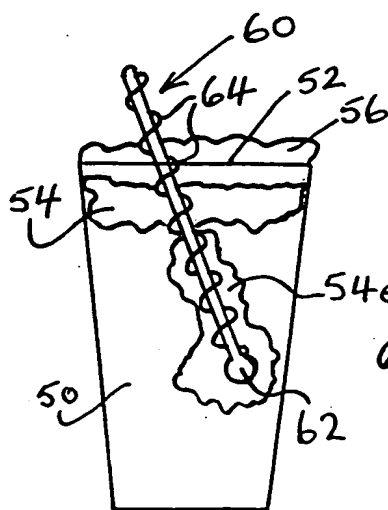


Fig. 6

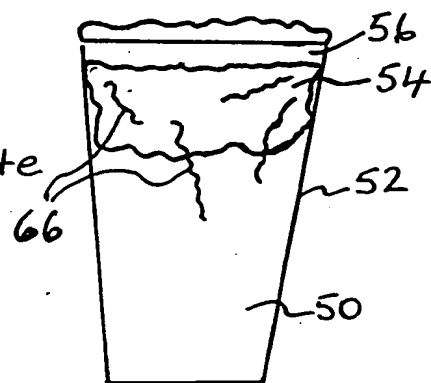


Fig. 7